

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CLAES I. NYLANDER, BRIAN J. BIRCH, CLIVE E. MARSHMAN
and PETER R. STEPHENSON

Appeal No. 95-1545
Application 07/842,329¹

HEARD: April 10, 1997

Before GARRIS, WEIFFENBACH and OWENS², Administrative Patent Judges.

WEIFFENBACH, Administrative Patent Judge.

DECISION ON APPEAL

¹Application for patent filed February 28, 1992. According to appellants, this application is a continuation-in-part of Application 07/530,436 filed June 1, 1990, now abandoned.

²Administrative Patent Judge Thierstein, who participated at the oral hearing held on April 10, 1997, was not available to take part in this decision. Administrative Patent Judge Owens has been substituted for Administrative Patent Judge Thierstein. In re Bose Corp., 772 F.2d 866, 869, 227 USPQ 1, 4 (Fed. Cir. 1985).

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This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-6, 8-11 and 13-15, the only claims remaining in the application. We reverse.

The Claimed Subject Matter

The claims on appeal are directed to a composite electrode comprising a non-conductive matrix containing metallic particles and metal salt particles on a solid non-conducting substrate. The salt particles and metallic particles form a gradient in the matrix wherein the ratio of metal particles to salt particles gradually increases from the outer surface to the inner surface of the non-conductive matrix. Claim 1 is illustrative of the claimed subject matter:

1. A composite electrode comprising:

a solid non-conducting substrate;

metallic particles;

a non-conductive matrix layer in which
the metallic particles are incorporated,
and

insoluble metal salt particles which
are of the same metal as the metallic
particles, which are incorporated in said
non-conductive matrix and which are
accessible to reactions with

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electrochemical reagents at the surface of the electrode, such that there are insoluble metal salt particles located between the metallic particles and the surface of the electrode and the surface of the electrode predominantly comprises metal salt particles whereby the ratio of metallic particles to insoluble metal salt particles gradually increases from the outermost towards the innermost portions of the non-conductive matrix layer.

The Rejection

The following prior art references are relied upon by the examiner to support the rejections of the claims:

Cosentino	3,662,745	May
16, 1972		
Boeke	4,133,732	Jan. 9,
1979		
Afromowitz et al. (Afromowitz)	4,133,735	Jan. 9,
1979		
Battaglia et al. (Battaglia)	4,214,968	Jul.
29, 1980		
Zick et al. (Zick)	4,450,842	May 29,
1984		

Fjeldly, T.A. et al., "Solid-State Ion-Selective Electrodes with Integrated Electronics," J. Electrochemical Soc., Vol. 126, No. 5, May 1979, pages 793-795.

Claims 1-6 and 13-15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Battaglia in view of Zick or Cosentino.

Claims 8-11 stand rejected under 35 U.S.C. § 103 as being unpatentable over Battaglia in view of Zick or Cosentino, Afromowitz and/or Boeke or Fjeldly.

Opinion

We have carefully considered the respective positions advanced by appellants and the examiner. For the reasons set forth below, we will not sustain either of the examiner's rejections.

The claims on appeal require that there be a gradient of metallic particles and metal salt particles in the non-conductive matrix such that "the surface of the electrode predominantly comprises metal salt particles, whereby the ratio of metallic particles to insoluble metal salt particles gradually increases from the outermost towards the innermost portions of the non-conductive matrix layer." According to appellants' disclosure, this is accomplished by treating the surface of the matrix layer which is treated to convert the metal particles to metal halide particles (specification, page 5, lines 19-29). Although Fig. 1 of Battaglia shows an Ag-AgCl ion-selective electrode having sequential continuous layers of Ag and AgCl on a non-conductive substrate (see also

col. 19, lines 9-16 and col. 8, lines 54-65), Battaglia discloses depositing a layer of Ag on a non-conductive substrate and then treating the layer with a chemical to convert at least 10% of the overall thickness of the Ag layer to AgCl (col. 9, lines 14-52). Since the processes appear to be similar, one skilled in the art would reasonably expect that Battaglia would also produce a gradient structure.

While the process for forming Battaglia's Ag-AgCl layers may be similar to that disclosed by appellants, Battaglia does not disclose or suggest a layer wherein there is a gradient of Ag and AgCl particles in a non-conductive matrix. The examiner recognized this deficiency and relies on Zick or Cosentino to show that it is known in the art to incorporate Ag and AgCl powders in a non-conductive matrix. The examiner concluded that "it would be obvious for Battaglia to adopt the Ag-AgCl electrode form of Zick or Cosentino wherein particles are incorporated within a non-conductive matrix" (Answer, page 3). We disagree with the examiner's conclusion because neither Zick nor Cosentino discloses or suggests a gradient of metal and metal salt particles in a non-conductive matrix.

Zick teaches forming a mixture of Ag and AgCl particles in a fusible glass frit, printing the mixture in a suitable pattern on a non-conducting substrate, and firing the mixture to form a Ag-AgCl layer on the substrate (col. 3, lines 43-48). Cosentino discloses in Example 1 applying a mixture of 3 parts of Ag particles, 1 part of AgCl particles, and one-half part aluminum oxide particles in an acrylic ester resin to the ends of an unstripped polyvinyl chloride insulated tinned copper wire to form a metal-metal salt electrode. Since Zick and Cosentino disclose Ag and AgCl in particulate form in a non-conductive matrix, it is the examiner's reasoning that

[i]t would be obvious for Battaglia to adopt the particle form because the particles would [sic, would] be firmly entrapped within the non-conductive matrix and thus would be securely adhered to the non-conductive substrate by way of the matrix. If the Ag is a film on the matrix, the Ag film would have an adhesion problem with the matrix, just as the Ag film has an adhesion problem with the non-conductive substrate in Battaglia. There would be no improvement. [Answer, page 5].

The test of obviousness is not what Battaglia would adopt, but what the combined teachings of the references would have suggested to those of ordinary skill in the art. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

Here we do not find that the combined teachings of the art would have suggested or led a person skilled in the art to the claimed subject matter. Neither Zick nor Cosentino discloses or suggests forming a gradient of metal particles and metal salt particles as required by appellants' claims. Clearly, substituting the Ag-AgCl matrices disclosed in either Zick or Cosentino for the Ag-AgCl layer of Battaglia would not result in the claimed subject matter. Moreover, there is no suggestion or teaching in Battaglia that would have led one skilled in the art to use Ag and AgCl particles in a non-conductive matrix. The examiner's reliance on adhesion of the layers as a problem to motivate one skilled in the art to combine Battaglia with Zick or Cosentino is pure speculation. Adhesion is not disclosed as a problem in the prior art relied upon by the examiner. The examiner has simply failed to provide sufficient reasoning from the teachings of the prior art which would have led a skilled artisan to an electrode having metal and metal salt particles in a non-conducting matrix wherein "the ratio of metallic particles to insoluble metal salt particles gradually increases from the outermost towards the innermost portions of the non-conductive matrix

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..." as required by the claims on appeal. Accordingly, for the reasons given above, the examiner's rejection of claims 1-6 and 13-15 for obviousness over Battaglia in view of Zick or Cosentino is reversed.

Since we do not find that Afromowitz, Boeke or Fjeldly cures the defects in Battaglia, Zick and Cosentino, we also reverse the examiner's rejection of claims 8-11 over Battaglia in view of Zick or Cosentino, Afromowitz and/or Boeke or Fjeldly.

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For the reasons given above, the decision of the examiner
is reversed.

REVERSED

	BRADLEY R. GARRIS)	
	Administrative Patent Judge))	
)	
)	
	CAMERON WEIFFENBACH)	BOARD OF
PATENT	Administrative Patent Judge))	APPEALS AND
)	INTERFERENCES
)	
	TERRY J. OWENS)	
	Administrative Patent Judge)		

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